

1/6

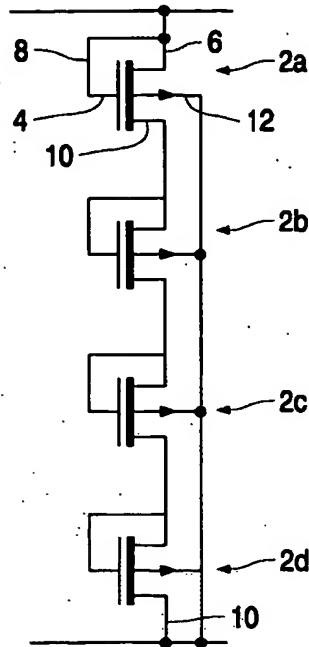


FIG.1

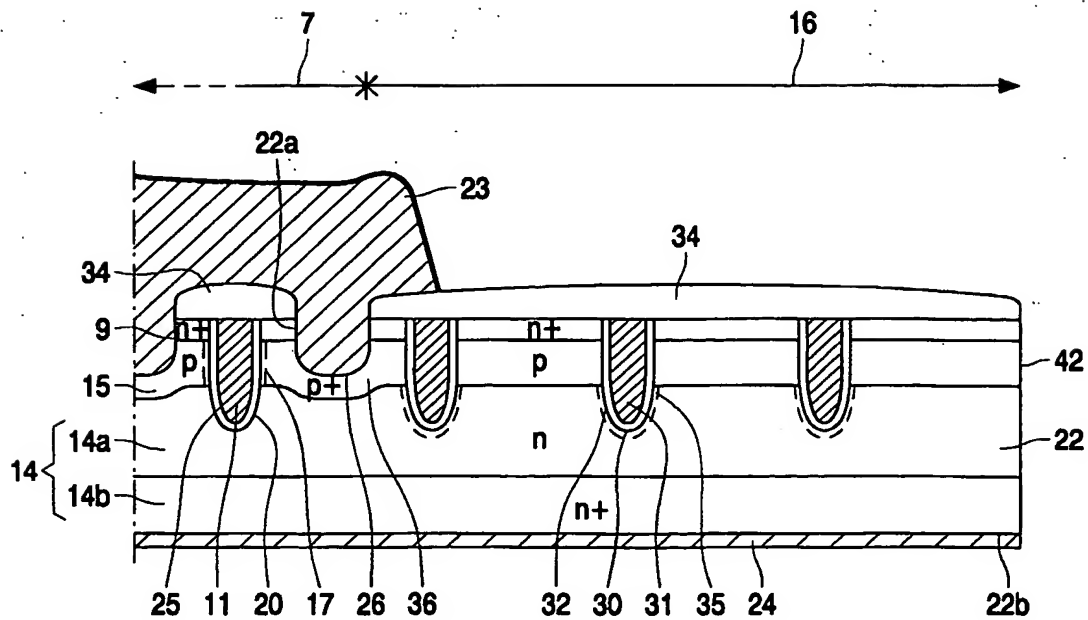


FIG.2

This cross-sectional view shows a semiconductor device with a trench isolation structure. A substrate 14 is composed of layers 14a and 14b. A base layer 15 is formed on the substrate. A trench 16 is formed in the base layer, and a trench isolation structure 17 is formed in the trench. The trench isolation structure 17 includes a trench bottom layer 18 and a trench sidewall layer 19. The trench bottom layer 18 is formed by a first layer 20 and a second layer 21. The trench sidewall layer 19 is formed by a third layer 22 and a fourth layer 23. The trench isolation structure 17 is formed by a fifth layer 24 and a sixth layer 25. The trench isolation structure 17 is formed by a seventh layer 26 and an eighth layer 27. The trench isolation structure 17 is formed by a ninth layer 28 and a tenth layer 29. The trench isolation structure 17 is formed by an eleventh layer 30 and a twelfth layer 31. The trench isolation structure 17 is formed by a thirteenth layer 32 and a fourteenth layer 33. The trench isolation structure 17 is formed by a fifteenth layer 34 and a sixteenth layer 35. The trench isolation structure 17 is formed by a seventeenth layer 36 and an eighteenth layer 37. The trench isolation structure 17 is formed by a nineteenth layer 38 and a twentieth layer 39. The trench isolation structure 17 is formed by a twenty-first layer 40 and a twenty-second layer 41. The trench isolation structure 17 is formed by a twenty-third layer 42 and a twenty-fourth layer 43. The trench isolation structure 17 is formed by a twenty-fifth layer 44 and a twenty-sixth layer 45. The trench isolation structure 17 is formed by a twenty-seventh layer 46 and a twenty-eighth layer 47. The trench isolation structure 17 is formed by a twenty-ninth layer 48 and a thirtieth layer 49. The trench isolation structure 17 is formed by a thirty-first layer 50 and a thirty-second layer 51. The trench isolation structure 17 is formed by a thirty-third layer 52 and a thirty-fourth layer 53. The trench isolation structure 17 is formed by a thirty-fifth layer 54 and a thirty-sixth layer 55. The trench isolation structure 17 is formed by a thirty-seventh layer 56 and a thirty-eighth layer 57. The trench isolation structure 17 is formed by a thirty-ninth layer 58 and a fortieth layer 59. The trench isolation structure 17 is formed by a forty-first layer 60 and a forty-second layer 61. The trench isolation structure 17 is formed by a forty-third layer 62 and a forty-fourth layer 63. The trench isolation structure 17 is formed by a forty-fifth layer 64 and a forty-sixth layer 65. The trench isolation structure 17 is formed by a forty-seventh layer 66 and a forty-eighth layer 67. The trench isolation structure 17 is formed by a forty-ninth layer 68 and a fiftieth layer 69. The trench isolation structure 17 is formed by a fifty-first layer 70 and a fifty-second layer 71. The trench isolation structure 17 is formed by a fifty-third layer 72 and a fifty-fourth layer 73. The trench isolation structure 17 is formed by a fifty-fifth layer 74 and a fifty-sixth layer 75. The trench isolation structure 17 is formed by a fifty-seventh layer 76 and a fifty-eighth layer 77. The trench isolation structure 17 is formed by a fifty-ninth layer 78 and a sixtieth layer 79. The trench isolation structure 17 is formed by a sixty-first layer 80 and a sixty-second layer 81. The trench isolation structure 17 is formed by a sixty-third layer 82 and a sixty-fourth layer 83. The trench isolation structure 17 is formed by a sixty-fifth layer 84 and a sixty-sixth layer 85. The trench isolation structure 17 is formed by a sixty-seventh layer 86 and a sixty-eighth layer 87. The trench isolation structure 17 is formed by a sixty-ninth layer 88 and a seventieth layer 89. The trench isolation structure 17 is formed by a seventy-first layer 90 and a seventy-second layer 91. The trench isolation structure 17 is formed by a seventy-third layer 92 and a seventy-fourth layer 93. The trench isolation structure 17 is formed by a seventy-fifth layer 94 and a seventy-sixth layer 95. The trench isolation structure 17 is formed by a seventy-seventh layer 96 and a seventy-eighth layer 97. The trench isolation structure 17 is formed by a seventy-ninth layer 98 and an eightieth layer 99. The trench isolation structure 17 is formed by an eighty-first layer 100 and an eighty-second layer 101. The trench isolation structure 17 is formed by an eighty-third layer 102 and an eighty-fourth layer 103. The trench isolation structure 17 is formed by an eighty-fifth layer 104 and an eighty-sixth layer 105. The trench isolation structure 17 is formed by an eighty-seventh layer 106 and an eighty-eighth layer 107. The trench isolation structure 17 is formed by an eighty-ninth layer 108 and a ninetieth layer 109. The trench isolation structure 17 is formed by a hundred-first layer 110 and a hundred-second layer 111. The trench isolation structure 17 is formed by a hundred-third layer 112 and a hundred-fourth layer 113. The trench isolation structure 17 is formed by a hundred-fifth layer 114 and a hundred-sixth layer 115. The trench isolation structure 17 is formed by a hundred-seventh layer 116 and a hundred-eighth layer 117. The trench isolation structure 17 is formed by a hundred-ninth layer 118 and a hundred-tenth layer 119. The trench isolation structure 17 is formed by a hundred-eleventh layer 120 and a hundred-twelfth layer 121. The trench isolation structure 17 is formed by a hundred-thirteenth layer 122 and a hundred-fourteenth layer 123. The trench isolation structure 17 is formed by a hundred-fifteenth layer 124 and a hundred-sixteenth layer 125. The trench isolation structure 17 is formed by a hundred-seventeenth layer 126 and a hundred-eighteenth layer 127. The trench isolation structure 17 is formed by a hundred-nineteenth layer 128 and a hundred-twentieth layer 129. The trench isolation structure 17 is formed by a hundred-twenty-first layer 130 and a hundred-thirty-second layer 131. The trench isolation structure 17 is formed by a hundred-thirty-third layer 132 and a hundred-thirty-fourth layer 133. The trench isolation structure 17 is formed by a hundred-thirty-fifth layer 134 and a hundred-thirty-sixth layer 135. The trench isolation structure 17 is formed by a hundred-thirty-seventh layer 136 and a hundred-thirty-eighth layer 137. The trench isolation structure 17 is formed by a hundred-thirty-ninth layer 138 and a hundred-fortieth layer 139. The trench isolation structure 17 is formed by a hundred-forty-first layer 140 and a hundred-forty-second layer 141. The trench isolation structure 17 is formed by a hundred-forty-third layer 142 and a hundred-forty-fourth layer 143. The trench isolation structure 17 is formed by a hundred-forty-fifth layer 144 and a hundred-forty-sixth layer 145. The trench isolation structure 17 is formed by a hundred-forty-seventh layer 146 and a hundred-forty-eighth layer 147. The trench isolation structure 17 is formed by a hundred-forty-ninth layer 148 and a hundred-fiftieth layer 149. The trench isolation structure 17 is formed by a hundred-fifty-first layer 150 and a hundred-fifty-second layer 151. The trench isolation structure 17 is formed by a hundred-fifty-third layer 152 and a hundred-fifty-fourth layer 153. The trench isolation structure 17 is formed by a hundred-fifty-fifth layer 154 and a hundred-fifty-sixth layer 155. The trench isolation structure 17 is formed by a hundred-fifty-seventh layer 156 and a hundred-fifty-eighth layer 157. The trench isolation structure 17 is formed by a hundred-fifty-ninth layer 158 and a hundred-sixtieth layer 159. The trench isolation structure 17 is formed by a hundred-sixty-first layer 160 and a hundred-sixty-second layer 161. The trench isolation structure 17 is formed by a hundred-sixty-third layer 162 and a hundred-sixty-fourth layer 163. The trench isolation structure 17 is formed by a hundred-sixty-fifth layer 164 and a hundred-sixty-sixth layer 165. The trench isolation structure 17 is formed by a hundred-sixty-seventh layer 166 and a hundred-sixty-eighth layer 167. The trench isolation structure 17 is formed by a hundred-sixty-ninth layer 168 and a hundred-seventieth layer 169. The trench isolation structure 17 is formed by a hundred-seventy-first layer 170 and a hundred-seventy-second layer 171. The trench isolation structure 17 is formed by a hundred-seventy-third layer 172 and a hundred-seventy-fourth layer 173. The trench isolation structure 17 is formed by a hundred-seventy-fifth layer 174 and a hundred-seventy-sixth layer 175. The trench isolation structure 17 is formed by a hundred-seventy-seventh layer 176 and a hundred-seventy-eighth layer 177. The trench isolation structure 17 is formed by a hundred-seventy-ninth layer 178 and a hundred-eightieth layer 179. The trench isolation structure 17 is formed by a hundred-eighty-first layer 180 and a hundred-eighty-second layer 181. The trench isolation structure 17 is formed by a hundred-eighty-third layer 182 and a hundred-eighty-fourth layer 183. The trench isolation structure 17 is formed by a hundred-eighty-fifth layer 184 and a hundred-eighty-sixth layer 185. The trench isolation structure 17 is formed by a hundred-eighty-seventh layer 186 and a hundred-eighty-eighth layer 187. The trench isolation structure 17 is formed by a hundred-eighty-ninth layer 188 and a hundred-ninetieth layer 189. The trench isolation structure 17 is formed by a hundred-ninety-first layer 190 and a hundred-ninety-second layer 191. The trench isolation structure 17 is formed by a hundred-ninety-third layer 192 and a hundred-ninety-fourth layer 193. The trench isolation structure 17 is formed by a hundred-ninety-fifth layer 194 and a hundred-ninety-sixth layer 195. The trench isolation structure 17 is formed by a hundred-ninety-seventh layer 196 and a hundred-ninety-eighth layer 197. The trench isolation structure 17 is formed by a hundred-ninety-ninth layer 198 and a two-hundredth layer 199. The trench isolation structure 17 is formed by a two-hundred-first layer 200 and a two-hundred-second layer 201. The trench isolation structure 17 is formed by a two-hundred-third layer 202 and a two-hundred-fourth layer 203. The trench isolation structure 17 is formed by a two-hundred-fifth layer 204 and a two-hundred-sixth layer 205. The trench isolation structure 17 is formed by a two-hundred-seventh layer 206 and a two-hundred-eighth layer 207. The trench isolation structure 17 is formed by a two-hundred-ninth layer 208 and a two-hundred-tenth layer 209. The trench isolation structure 17 is formed by a two-hundred-eleventh layer 210 and a two-hundred-twelfth layer 211. The trench isolation structure 17 is formed by a two-hundred-thirteenth layer 212 and a two-hundred-fourteenth layer 213. The trench isolation structure 17 is formed by a two-hundred-fifteenth layer 214 and a two-hundred-sixteenth layer 215. The trench isolation structure 17 is formed by a two-hundred-seventeenth layer 216 and a two-hundred-eighteenth layer 217. The trench isolation structure 17 is formed by a two-hundred-nineteenth layer 218 and a two-hundred-twentieth layer 219. The trench isolation structure 17 is formed by a two-hundred-twenty-first layer 220 and a two-hundred-thirty-second layer 221. The trench isolation structure 17 is formed by a two-hundred-thirty-third layer 222 and a two-hundred-thirty-fourth layer 223. The trench isolation structure 17 is formed by a two-hundred-thirty-fifth layer 224 and a two-hundred-thirty-sixth layer 225. The trench isolation structure 17 is formed by a two-hundred-thirty-seventh layer 226 and a two-hundred-thirty-eighth layer 227. The trench isolation structure 17 is formed by a two-hundred-thirty-ninth layer 228 and a two-hundred-fortieth layer 229. The trench isolation structure 17 is formed by a two-hundred-forty-first layer 230 and a two-hundred-forty-second layer 231. The trench isolation structure 17 is formed by a two-hundred-forty-third layer 232 and a two-hundred-forty-fourth layer 233. The trench isolation structure 17 is formed by a two-hundred-forty-fifth layer 234 and a two-hundred-forty-sixth layer 235. The trench isolation structure 17 is formed by a two-hundred-forty-seventh layer 236 and a two-hundred-forty-eighth layer 237. The trench isolation structure 17 is formed by a two-hundred-forty-ninth layer 238 and a two-hundred-fiftieth layer 239. The trench isolation structure 17 is formed by a two-hundred-fifty-first layer 240 and a two-hundred-fifty-second layer 241. The trench isolation structure 17 is formed by a two-hundred-fifty-third layer 242 and a two-hundred-fifty-fourth layer 243. The trench isolation structure 17 is formed by a two-hundred-fifty-fifth layer 244 and a two-hundred-fifty-sixth layer 245. The trench isolation structure 17 is formed by a two-hundred-fifty-seventh layer 246 and a two-hundred-fifty-eighth layer 247. The trench isolation structure 17 is formed by a two-hundred-fifty-ninth layer 248 and a two-hundred-sixtieth layer 249. The trench isolation structure 17 is formed by a two-hundred-sixty-first layer 250 and a two-hundred-sixty-second layer 251. The trench isolation structure 17 is formed by a two-hundred-sixty-third layer 252 and a two-hundred-sixty-fourth layer 253. The trench isolation structure 17 is formed by a two-hundred-sixty-fifth layer 254 and a two-hundred-sixty-sixth layer 255. The trench isolation structure 17 is formed by a two-hundred-sixty-seventh layer 256 and a two-hundred-sixty-eighth layer 257. The trench isolation structure 17 is formed by a two-hundred-sixty-ninth layer 258 and a two-hundred-seventieth layer 259. The trench isolation structure 17 is formed by a two-hundred-seventy-first layer 260 and a two-hundred-seventy-second layer 261. The trench isolation structure 17 is formed by a two-hundred-seventy-third layer 262 and a two-hundred-seventy-fourth layer 263. The trench isolation structure 17 is formed by a two-hundred-seventy-fifth layer 264 and a two-hundred-seventy-sixth layer 265. The trench isolation structure 17 is formed by a two-hundred-seventy-seventh layer 266 and a two-hundred-seventy-eighth layer 267. The trench isolation structure 17 is formed by a two-hundred

[illegible]

**FIG.4**

3/6

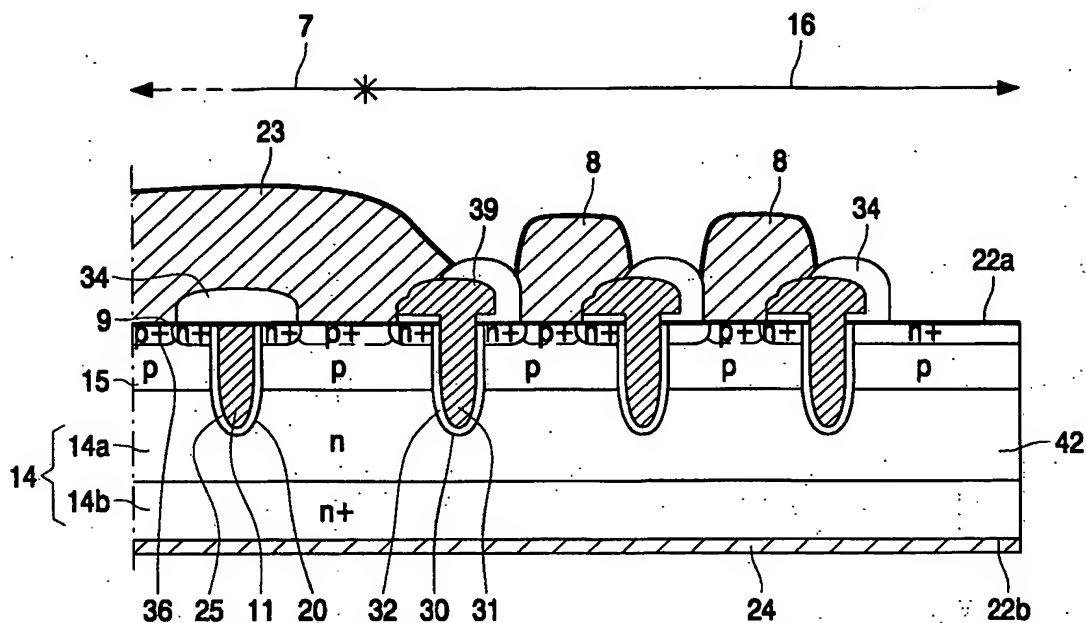


FIG. 5

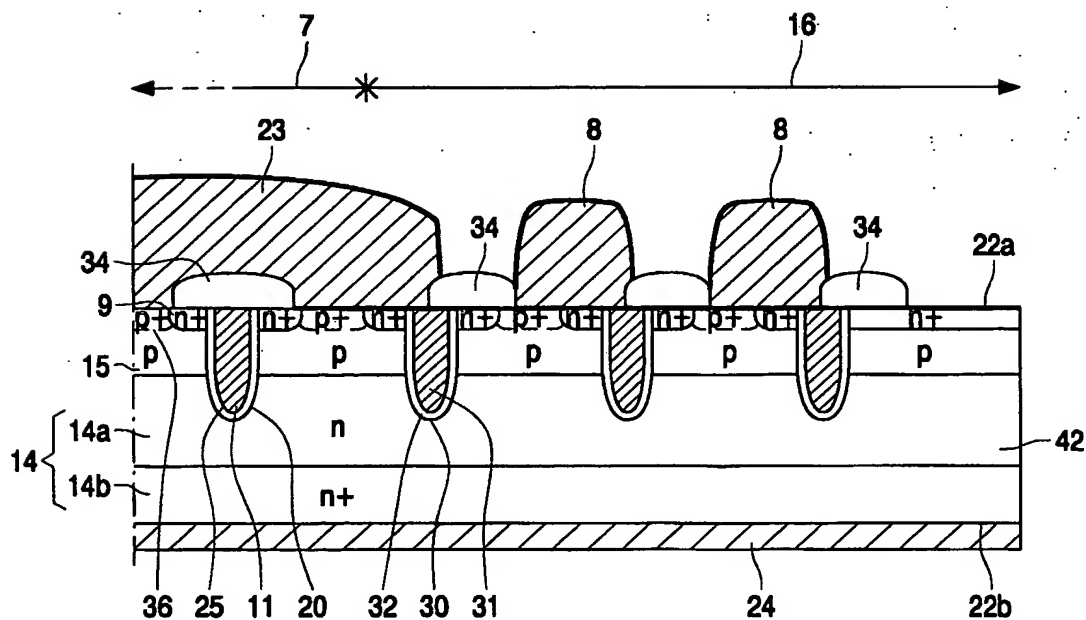


FIG. 6

4/6

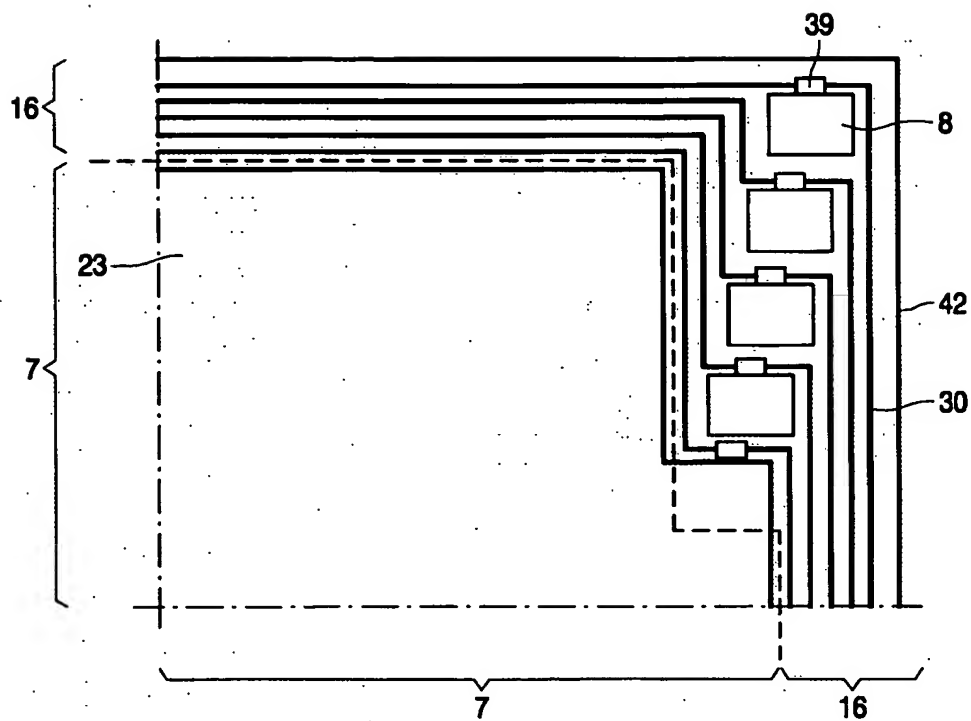


FIG. 7



6/6

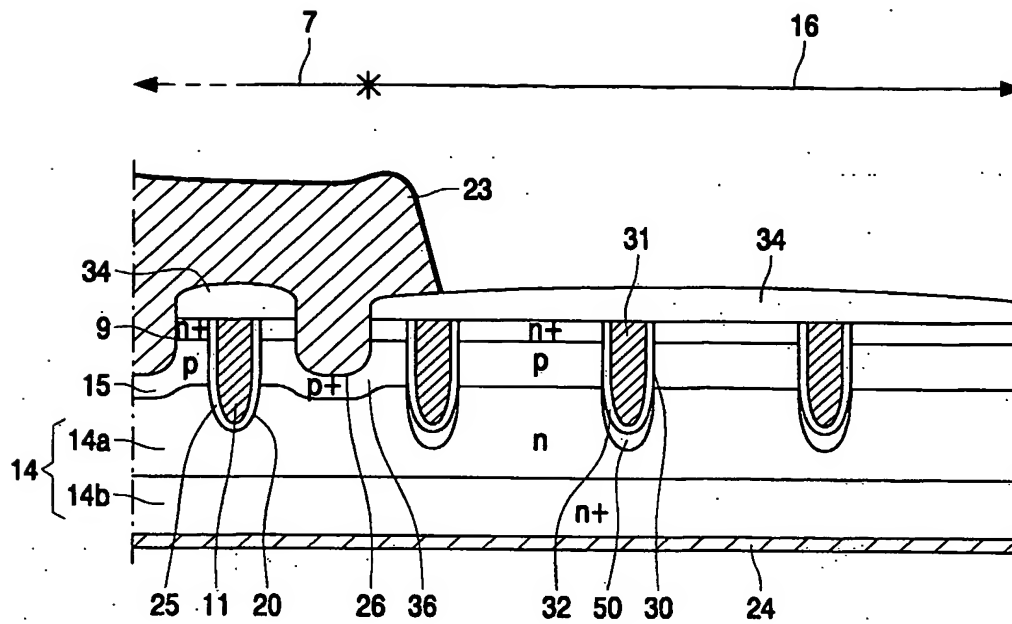


FIG.10

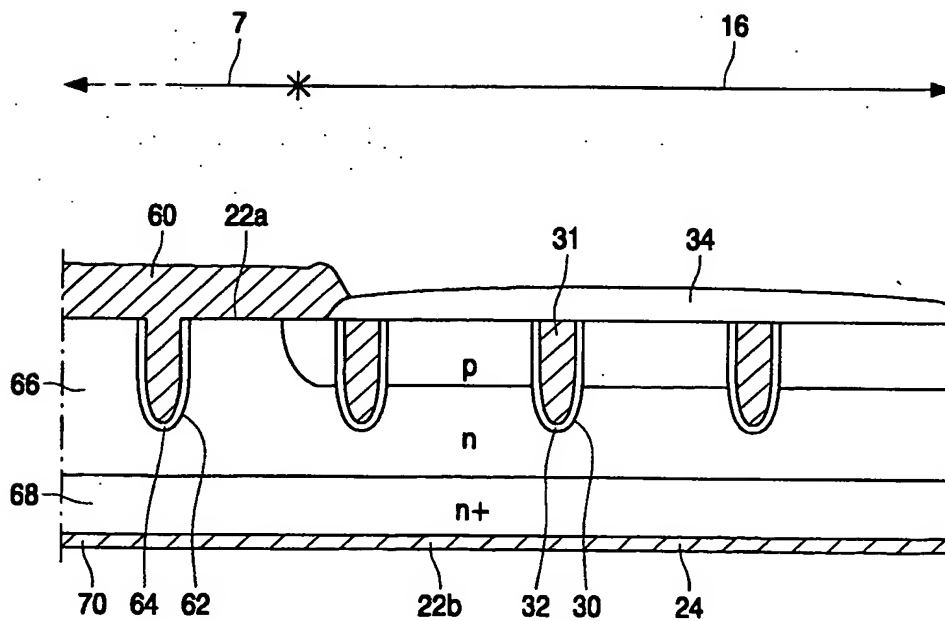


FIG.11